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EXAMINER

HSIEH, SHIH WEN

ART UNIT

PAPER NUMBER

2861

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/688,871

Applicant(s)

GIBSON ET AL.

Examiner

Shih-wen Hsieh

Art Unit

2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3,4,6,7,9-14,16-22,24,25,27,28,30-35,37-42 and 44-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 45 and 47 is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6,7,9-13,16-22,24,25,27,28,30-34,37-42,44,46,48 and 49 is/are rejected.
- 7) ☒ Claim(s) 14 and 35 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

***Response to Amendment***

***Drawings***

1. The informal drawings are not of sufficient quality to permit examination. Accordingly, replacement drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to this Office action. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action.

Applicant is given a TWO MONTH time period to submit new drawings in compliance with 37 CFR 1.81. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a). Failure to timely submit replacement drawing sheets will result in ABANDONMENT of the application.

For instance, in the specification page 12, line 7 "see fig. 8". However, fig. 8 shows two blackened rectangular (figs. 4 and 5, etc. have the same situation), so Examiner is unable to understand; "In fig. 8, the satellite ink drops touch the main drops in every other pair of rows in both direction of printing" described in page 12, lines 7-8.

2. The indicated allowability of claims 8 and 29 are withdrawn. Rejections based on the 35 USC 112 are set forth below. Since Applicants canceled claims 8 and 29 and

incorporated them into claim 1 forming new claims 44 and 46 respectively, therefore, the 35 USC 112 second paragraph rejection is set forth to claims 44 and 46.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 44 and 46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation of: "the satellites droplets are vertically offset from the main drops" is unclear. Because in looking all of the drawings in the fourteen sheets, the satellite droplets are slant offset from the main drops, and strictly speaking, is not "vertically" offset from the main drop. Specially, the orientation of the print head in this application is facing downward, so ink droplet is ejected in a vertically downward direction. The main drop and the satellite drop are originated at the same point, i.e., the nozzle. After the satellite separated from the main drop, the satellite assumes a slant path or a path angled with path of the main drop, figs. 1A to 3C describe this situation. This angled path or slant path should have two components: horizontal and vertical, and after the satellite traveling a certain distance, or the gap between the head and the medium, landed on the medium, and its position on the medium is either to the right of the main drop or to the left of the main drop. Therefore, the flying trace of the satellite droplets is

not completely vertical leading the offset is not vertical, and based on the position of the satellite droplet on the medium with respect to the position of the main drop on the medium, the satellite droplet is horizontally offset. Because the medium is horizontally placed instead it is vertically placed. Please explain how the satellite droplets are vertically offset from the main drops.

Claims 9, 10, 30 and 31 depend on claims 44 and 46 respectively, and are also rejected.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1, 3, 4, 6, 7, 11-13, 16-19/1/3-4/6-7/9-14/44/45/48, 22, 24-25, 27, 28, 32-34, 37-40/22/24-25/27-28/30-35/36/47/49, 48 and 49 are rejected under 35 U.S.C. 102(a) as being anticipated by Freire et al. (US 2003/0179258).

In regard to:

Claim 1:

Freire et al. teach:

Apparatus including a printhead for an inkjet printer (refer to fig. 6), the printhead comprising: an ink reservoir (which is an integral part of the head 8 in fig. 6); nozzles

(12, figs. 1-5) for ejecting ink from the ink reservoir onto print media, the nozzles being formed in the inkjet printer printhead in a predetermined fashion (refer to figs. 5a to 5G and page 5 [0064]) with bores purposefully shaped and/or directed to determine the formation and placement of satellite droplets when ink is ejected from the ink reservoir when the printhead is part of an inkjet printer, refer to page 2, [0015] to [0018];

wherein: (a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles (refer to figs. 8 and 9), (b) each nozzle includes a bore (refer to fig. 4), (c) each bore has an axis (Freire et al. do not indicate explicitly the axis, however, it is understood, the axis is through the bore's center), (d) a first plurality of the nozzles have the axes of their bores aligned in a first direction (in any of the fashions shown in figs. 5A to 5G), (e) when ink is ejected through the nozzles, each of the satellite droplets ejected through the first plurality of the nozzles is offset from the main drop ejected through the first plurality of the nozzles in substantially the same direction and at substantially the same distance, refer to figs. 8 and 9, and page 4 [0052].

Claims 4 and 11:

Freire et al. further teach:

wherein (f) a second plurality of the nozzles have the axes of their bores aligned in a second direction, (g) when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite

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droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles, refer to page 2, [0018].

Claim 6:

Freire et al. further teach:

wherein each of the satellite droplets ejected falls within the area of a main drop, thus producing no additional satellite droplets on the media, refer to page 1, [0014], specially, page 2, lines 16-20.

Claim 7:

Freire et al. further teach:

wherein the inkjet print head travels laterally while printing, and the satellite droplets are laterally offset from the main drops, refer to page 4, [0052] and/or figs. 8 and/or 9.

Claim 12:

Freire et al. further teach:

an inkjet printer including the printhead, and wherein the inkjet printer includes means for printing in a single lateral direction so that the main drop and satellite droplet at least partially overlap, refer to page 1, [0014], specially, page 2, lines 16-20.

Claim 13:

Freire et al. further teach:

an inkjet printer including the printhead, and wherein the bores are aligned so that the main drop and satellite droplet ejected from substantially all of the nozzles at

least partially overlap when the printer prints, refer to page 1, [0014], specially, page 2, lines 16-20.

Claim 16/1/3-4/6-7/9-14/44/45/48:

Freire et al. further teach:

Wherein the nozzle bores are oriented such that they eject ink opposite the direction of travel of the print head when the print head is moving and printing, refer to fig. 5C.

Claim 17/1/3-4/6-7/9-14/44/45/48:

Freire et al. further teach:

an inkjet print head comprising the inkjet print head chip. Note: generally a print head is build on a substrate or wafer or chip.

Claim 18:

Freire et al. further teach:

an ink jet printer comprising the inkjet print head, refer to fig. 6.

Claim 19/1/3-4/6-7/9-14/44/45/48:

Freire et al. further teach:

wherein the printhead has large and small nozzles, refer to figs. 5D and 5E.

Claim 22 (method claim):

A method of controlling the formation and placement of satellite droplets ejected from an ink jet printer printhead comprising the steps of: providing an ink jet printer pdnthead having an ink reservoir; forming nozzles in the ink jet printer printhead; installing the printhead in an ink jet printer; ejecting ink from the reservoir through the



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nozzles in the form of main drops and satellite droplets in a manner to achieve uniform density control by controlling the formation and placement of satellite droplets when ink is ejected from the reservoir of the ink jet printer printhead when the printhead is part of an inkjet printer;

wherein: (a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles, (b) each nozzle includes a bores, (c) each bore has an axis, (d) a first plurality of the nozzles have the axes of their bores aligned in a first direction, (e) when ink is ejected through the nozzles, each of the satellite droplets ejected through the first plurality of the nozzles is offset from the main drop ejected through the first plurality of the nozzles in substantially the same direction and at substantially the same distance.

Rejection:

The steps in this method claim are deemed to be made inherent by the functions of the structure in the combination discussed above for claim 1.

Eliminating or minimizing the banding defects in Freire et al. corresponds to the achieving uniform density control in this claim.

Claim 25:

The method of claim 22, wherein:

(f) a second plurality of the nozzles have the axes of their bores aligned in a second direction, (g) when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets

ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles.

Rejection:

The steps in this method claim are deemed to be made inherent by the functions of the structure in the combination discussed above for claim 4.

Claim 27:

wherein: each of the satellite droplets ejected falls within the area of a main drop, thus producing no additional satellite droplets on the media.

Rejection:

This claim is rejected on the basis as set forth for claim 6 discussed above.

Claim 28:

wherein the inkjet print head travels laterally while printing, and the satellite droplets are laterally offset from the main drops.

Rejection:

This claim is rejected on the basis as set forth for claim 7 discussed above.

Claim 32:

The method of claim 22, wherein: (f) a second plurality of the nozzles have their axes of their bores aligned in a second direction, (g) when ink is ejected through the nozzles, satellite droplets ejected through the first plurality of the nozzles are offset from the main drops ejected through the first plurality of the nozzles in a different direction from which satellite droplets ejected through the second plurality of the nozzles are offset from the main drops ejected through the second plurality of the nozzles.

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Rejection:

This claim is rejected on the basis as set forth for claim 11 discussed above.

Claim 33:

The method of claim 22, further comprising the step of providing an inkjet printer including the printhead, and wherein the inkjet printer includes means for printing in a single lateral direction so that the main drop and satellite droplet at least partially overlap.

Rejection:

This claim is rejected on the basis as set forth for claim 12 discussed above.

Claim 34:

The method of claim 22, further comprising the step of providing an inkjet printer including the printhead, and wherein the bores are aligned so that the main drop and satellite droplet ejected from substantially all of the nozzles at least partially overlap when the printer prints.

Rejection:

This claim is rejected on the basis as set forth for claim 13 discussed above.

Claim 37/22/24-25/27-28/30-35/46/47/49:

wherein the nozzle bores are oriented such that they eject ink opposite the direction of travel of the print head when the print head is moving and printing.

Rejection:

This claim is rejected on the basis as set forth for claim 6 discussed above.

Claim 38/22/24-25/27-28/30-35/46/47/49:

further comprising the step of providing an inkjet print head comprising the inkjet print head chip.

Rejection:

This claim is rejected on the basis as set forth for claim 17/1/3-4/6-7/9-14/44/45/48 discussed above.

Claim 39/22/24-25/27-28/30-35/46/47/49:

further comprising the step of providing an ink jet printer comprising the inkjet print head.

Rejection:

This claim is rejected on the basis as set forth for claim 18/1/3-4/6-7/9-14/44/45/48 discussed above.

Claim 40/22/24-25/27-28/30-35/46/47/49:

wherein the print head has large and small nozzles.

Rejection:

This claim is rejected on the basis as set forth for claim 19/1/3-4/6-7/9-14/44/45/48 discussed above.

Claim 48:

Apparatus including a printhead for an inkjet printer, the printhead comprising: an ink reservoir; nozzles for ejecting ink from the ink reservoir onto print media, the nozzles being formed in the ink jet printer printhead in a predetermined fashion with bores purposefully shaped and/or directed to determine the formation and placement of

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satellite droplets when ink is ejected from the ink reservoir when the printhead is part of an inkjet printer;

wherein: (a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles, (b) each nozzle includes a bore, (c) the printhead is used in a printer which prints in two directions, and (d) the bore of each nozzle is shaped such that, when ink is ejected through the nozzles, satellite droplets and main drops are balanced—the combined area of satellite droplet and main drop in a first printing direction is as nearly equal as possible to the combined area of the satellite droplet and main drop in a second printing direction opposite to the first printing direction.

Rejection:

This claim is rejected on the basis as set forth for claim 1 discussed above. As to (d) portion in this claim, please refer to fig. 8 or fig. 9 and page 2, [0015] and [0018].

Claim 49:

A method of controlling the formation and placement of satellite droplets ejected from an ink jet printer printhead comprising the steps of: providing an ink jet printer printhead having an ink reservoir; forming nozzles in the ink jet printer printhead; installing the printhead in an ink jet printer; ejecting ink from the reservoir through the nozzles in the form of main drops and satellite droplets in a manner to achieve uniform density control by controlling the formation and placement of satellite droplets when ink is ejected from the reservoir of the ink jet printer printhead when the printhead is part of an inkjet printer;

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wherein: (a) each of the nozzles produces a main drop and a satellite droplet when ink is ejected through the nozzles, (b) each nozzle includes a bore, (c) the printhead is used in a printer which prints in two directions, and (d) the bore of each nozzle is shaped such that, when ink is ejected through the nozzles, satellite droplets and main drops are balanced—the combined area of satellite droplet and main drop in a first printing direction is as nearly equal as possible to the combined area of the satellite droplet and main drop in a second printing direction opposite to the first printing direction.

Rejection:

The steps in this method claim are deemed to be made inherent by the functions of the structure in the combination as discussed for claim 48 above.

Claim 3:

Freire et al. further teach:

wherein: when ink is ejected through the nozzles, satellite droplets ejected through the nozzles at least partially overlap the main drops in each direction of printing, refer to page 1 [0014], specially, page 2, lines 16-20.

Claim 24:

The method of claim 49, wherein: when ink is ejected through the nozzles, satellite droplets ejected through the nozzles at least partially overlap the main drops in each direction of printing.

Rejection:

This claim is rejected on the basis as set forth for claim 3 discussed above.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 20-21/1/3-4/6-7/9-14/44/45/48 and 41-42//22/24-25/27-28/30-35/46/47/49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freire et al.

In regard to:

Claim 20/1/3-4/6-7/9-14/44/45/48:

the device of Freire et al. DIFFERS from claim 20/1/3-4/6-7/9-14/44/45/48 in that it does not teach:

wherein the nozzle bores are formed in polyimide film.

This claim is related to the material of the bore.

Therefore it would have been obvious to a person having ordinary skill in the art at the time the invention was made to select a material used to form the bores of the nozzles, since it has been held to be within a general skill of a worker in the art to select a known material on the basis of its suitability for the intended use, refer to MPEP 2144.07.

Claim 21/1/3-4/6-7/9-14/44/45/48:

the device of Freire et al. DIFFERS from claim 21/1/3-4/6-7/9-14/44/45/48 in that it does not teach:

wherein the nozzle bores are cut with an excimer laser.

Using laser ablation to form nozzle bores is well-known in the art, refer to MPEP 2144.03, In re Malcolm, 129 F.2d 529, 54 USPQ 235 (CCPA 1942).

Therefore it would have been obvious matter that one of the methods available in the market can be adopted to form nozzle bores, and certainly, laser ablation is one of the selection.

Claim 41/22/24-25/27-28/30-35/46/47/49:

Wherein the nozzle bores are formed in polyimide film.

Rejection:

This claim is rejected on the basis as set forth for claim 20/1/3-4/6-7/9-14/44/45/48.

Claim 42/22/24-25/27-28/30-35/46/47/49:



wherein the nozzle bores are cut with an excimer laser

Rejection:

This claim is rejected on the basis as set forth for claim 21/1/3-4/6-7/9-14/44/45/48.

***Allowable Subject Matter***

9. Claims 45 and 47 are allowed.

10. Claims 14 and 35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the allowance of claims 14 and 35 is the inclusion of the limitation of when ink is ejected through the nozzles, the main drops ejected through the first plurality of the nozzles are offset in a different direction from the fire point from which main drops ejected through the second plurality of the nozzles are offset from the tire point . It is this limitation found in each of the claims, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

### ***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

### ***Response to Arguments***

13. Applicant's arguments with respect to claims 43 have been considered but are moot in view of the new ground(s) of rejection.

New reference US 2003/0179258, "Methods and apparatus for reducing or minimizing satellite defects in fluid ejector systems" to Freire et al., filed on March 21, 2002, published on Sept. 25, 2003 is used in this office action.

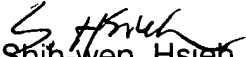
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14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shih-wen Hsieh whose telephone number is 571-272-2256. The examiner can normally be reached on 7:30AM -5:00PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, S D. Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**SHIH-WEN HSIEH**  
**PRIMARY EXAMINER**

  
Shih-wen Hsieh  
Primary Examiner  
Art Unit 2861

SWH

  
March 1, 2006